Application of FE Modelling of Machining Using DEFORM™

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DEFORM™ is a robust modelling software tool which uses the finite element method (FEM) for modelling technologies in 2D and, naturally, in 3D. One of the processes, the modelling of which DEFORM™ supports, is slab milling.
For this purpose it uses an advanced FE model with various parameters, such as the fracture criterion. If their values are not chosen correctly, the desired results cannot be obtained.
A 3D simulation model was developed to explore the capabilities for entering data, calculating and evaluating temperature distribution within a workpiece during experimental milling carried out under real-world cutting conditions. The FEM model concerns the temperature on the rake face of an exchangeable cutting insert. The primary aspect which was monitored was the temperature field during chip formation.
Finally, the results of the simulation were compared with data from a machining experiment. The material used for the simulation and for the machining experiment was the ČSN 12050.1 / AISI 1045 steel.

Keywords: slab milling, computer simulation, FEM, DEFORM™, experiments

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